REMARKS

Objections To Drawings

The Examiner objects to the description for Figure 7. Applicant submits that the description for Figure 7A and 7B have been amended to obviate the objection.

Rejection Under 35 USC §101

Claims 5 and 7-8 are rejected under 35 U.S.C. §101 for claiming non-statutory subject matter. This rejection is respectfully traversed.

Applicant submits that claim 5 has been amended to recite an isolated DNA, and claim 7 has been amended to recite a recombinant host cell, thereby distinguishing the claimed subject matters from naturally occurring materials. Accordingly, Applicant respectfully requests that the rejection of claims 5 and 7-8 under 35 U.S.C. §101 be withdrawn.

Rejection Under 35 USC §112, 2nd Paragraph

Claims 1-5 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite. This rejection is respectfully traversed.

Claims 1, 2 and 5 have been amended to delete the term "hybridizes" or "selectively hybridize". Claim 1 is drawn to SEQ ID NO.

1 and nucleic acids differ from SEQ ID NO. 1 in codon sequence due to the degeneracy of the genetic code. Claim 2 is drawn to fragments of SEQ ID NO. 1. Claim 5 is drawn to genomic DNA that has the same coding sequences as SEQ ID NO. 1. Applicant submits that the claims have clearly defined the claimed subject matter based on SEQ ID NO. 1. Accordingly, Applicant respectfully requests that the rejection of claims 1-5 under 35 U.S.C. §112, second paragraph, be withdrawn.

Rejection Under 35 USC §112, 1st Paragraph

Claims 1-4 are rejected under 35 U.S.C. §112, first paragraph, for failing to comply with written description requirement. This rejection is respectfully traversed.

Claim 1 is drawn to SEQ ID NO. 1 and nucleic acids differ from SEQ ID NO. 1 in codon sequence due to degeneracy of the genetic code. Redundancy or degeneracy of the DNA code refers to the fact that an amino acid can be encoded by more than one codon sequence. This is a basic and well-known fact in the science of biology. Codon sequences for each and every amino acid are readily available in the art (see Table 1). Therefore, given a coding sequence such as SEQ ID NO. 1, one of ordinary skill in the art could readily come up with a coding sequence that encodes the same protein but is different from SEQ ID NO. 1 in

codon sequence due to degeneracy of the genetic code. Applicant submits that the disclosure of SEQ ID NO. 1 has provided sufficient written description that covers sequences containing degenerated genetic codes.

Claim 2 is drawn to a fragment derived from SEQ ID NO. 1. Such fragment contains at the minimum 10 consecutive nucleotides of SEQ ID NO. 1, and at the maximum the full length sequence of SEQ ID NO. 1. Each and every claimed fragment is based on the sequence of SEQ ID NO. 1; hence, the disclosure of SEQ ID NO. 1 has provided sufficient written description for the claimed fragments. Accordingly, Applicant respectfully requests that the rejection of claims 1-4 under 35 U.S.C. §112, first paragraph, be withdrawn.

Rejection Under 35 USC §101

Claims 1-8 are rejected under 35 U.S.C. §101 for lack of utility. This rejection is respectfully traversed.

The present invention describes a novel gene, *Evi27*, with homology to the *IL-17 receptor* gene. Amino acid sequence comparisons showed that the Evi27 protein has significant homology throughout its coding region to the human and mouse IL-17 receptor (Figure 6). The position of the transmembrane domain with respect to

the amino terminus is essentially the same in the two proteins (page 52, line 19 to page 53, line 3). The human Evi27 protein is 76% identical to the mouse Evi27 protein at the amino acid level. This is somewhat higher than the recently described homology between the mouse and human IL-17 receptors, which is 69% identical at the amino acid level (page 58, line 16 to page 59, line 1).

These results indicate that the Evi27 protein is a member of the IL-17 receptor family. Based on previous reports, it is believed that Evi27 may be the receptor for two newly discovered IL-17 cytokines, IL-17B and IL-17C, that do not bind the IL-17 receptor extracellular domain. In a survey of cytokine induction, IL-17B and IL-17C stimulate the release of TNF-a and IL-1b from the monocytic leukemia cell line THP-1. (page 65, line 12 to page 66, line 3).

Based on these data a model for Evi27 in myeloid leukemia development is proposed (page 66, lines 3-15). Terminal differentiation of myelomonocytic precursor cells likely result in the down regulation of Evi27 expression. However, proviral insertions at Evi27 result in constitutive expression of the receptor. Binding of IL-17B/C to the Evi27 receptor would trigger the release of TNF-a and IL-1b by the leukemic cells. The secreted TNF-a and IL-1b would in turn provoke the production of multilinage hematopoietic growth factors,

adhesion molecules, and inflammatory cytokines by stromal cells. These stromal cell derived factors then support the growth and survival of the leukemia cell and may account for the absolute dependence of the B160 leukemia on the stromal feeder layer for growth and survival.

Hence, Applicant submits that in view of the present disclosure, a person of ordinary skill in the art would immediately appreciate the usefulness of Evi27 protein based on the homology of Evi27 to a well-characterized protein IL-17 receptor. Courts have routinely found evidence of structural similarity to a compound known to have a particular therapeutic or pharmacological utility as being supportive of an assertion of therapeutic utility for a new compound (M.P.E.P. §2107.03 II). One of ordinary skill in the art would readily recognize that Evi27 may mediate the secretion of proinflammatory cytokines such as IL-8 and plays important role in the developmental and/or disease processes of hematopoietic cells. Therefore, modulating the expression of Evi27 at the RNA or protein level may be exploited for use in the treatment of diseases such as cancer or autoimmune diseases (page 67, line 14 to page 68, line 2). Applicant submits that one of ordinary skill in the art would find these uses for Evi27 logical and credible.

The Examiner contends that there is no indication in the specification that shows the protein encoded by SEQ ID NO. 1 exists or is translated. Applicant respectfully disagrees.

The specification does show the protein encoded by SEQ ID NO. 1 is translated and expressed. Figure 13 shows western blot analysis of Evi27 expression in human cell lines such as colon adenocarcinoma, megakaryocytic leukemia, monocytic leukemia, chronic myelogenous leukemia, promyelocytic leukemia, multiple myeloma, cervical carcinoma and erythrocytic leukemia. The antibody recognizes proteins of 55 kD and 30 kD, which are the expected size for human Evi27 protein isoforms. Antibody binding could be competed away by preincubating the anti-Evi27 antisera with Evi27 peptide, indicating the western blot is specific for Evi27. Figure 14 further shows surface expression of Evi27 on human hematopoietic cell lines as determined by flow cytometry analysis.

To properly reject a claimed invention under 35 U.S.C. 101, the Patent Office must (A) make a *prima facie* showing that the claimed invention lacks utility, and (B) provide a sufficient evidentiary basis for factual assumptions relied upon in establishing the *prima facie* showing (M.P.E.P. §2107.02 IV). The Examiner has not provided sufficient factual basis to make a *prima facie* showing that the claimed invention

lacks utility. The Examiner's assertion that Evi27 is not expressed in human is not true. On the other hand, Applicant submits that a person of ordinary skill in the art would immediately appreciate the usefulness of Evi27 protein based on the homology of Evi27 to a well-characterized protein IL-17 receptor. Accordingly, Applicant respectfully requests that the rejection of claims 1-8 under 35 U.S.C. §101 be withdrawn.

Rejection Under 35 USC §112, 1st Paragraph

Claims 1-8 are rejected under 35 U.S.C. §112, first paragraph, for lack of utility. This rejection is respectfully traversed.

A 35 U.S.C. 112, first paragraph, rejection should not be imposed or maintained unless an appropriate basis exists for imposing a rejection under 35 U.S.C. 101 (M.P.E.P. §2107.01 IV). As discussed above, the Examiner has not established an appropriate basis for rejecting claims 1-8 under 35 U.S.C. 101. Therefore, Applicant respectfully requests that the rejection of claims 1-8 under 35 U.S.C. §112, first paragraph, be withdrawn.

This is intended to be a complete response to the Office Action mailed June 5, 2003. If any issues remain outstanding, the Examiner is

respectfully requested to telephone the undersigned attorney of record for immediate resolution.

Respectfully submitted,

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